

SCIENCE.—SUPPLEMENT.

FRIDAY, JANUARY 8, 1886.

THE PALACE OF THE KINGS OF TIRYNS.

"THE untiring enthusiasm and liberality of one man have earned the gratitude of all civilized races, so long as the human past shall have any interest for mankind." These were the words with which one of the most accomplished of English scholars welcomed the appearance of Dr. Schliemann's narrative of his explorations at ancient Mykenae. And now we have to thank him for another volume,¹ equalling in interest the four he has already given to the world of letters, and even surpassing them in the beauty of its mechanical execution. Moreover, we think he has displayed sound judgment in allowing his learned collaborators to contribute the major part of the text of the present volume, for it is by his energy and success as an explorer that he will be always remembered. He is neither a learned scholar nor a trained archeologist; and, where he has relied solely upon his own resources in setting forth the results of his researches, he has frequently drawn conclusions which have met with but little favor at the hands of scholars. From similar failings the present work is by no means exempt: but such blemishes, like patches on the cheek of beauty, only heighten the intrinsic merits of this most important contribution to our knowledge of the ancient world; not to our knowledge of what is commonly understood by the phrase 'prehistoric times,'—for we think it a misnomer to call what he has brought to light 'the prehistoric palace of the kings of Tiryns,' who, as he thinks, flourished some fourteen hundred years B.C.,—but to our accurate comprehension of the heroic age of Greece, those early times about which, hitherto, the Homeric poems have been our only source of information. We may well be grateful to him for the light which has thus been shed upon many an obscure passage or questionable statement in those earliest records of the western world. But in regard to what is known in archeology as the 'prehistoric period,' by which is to be understood a certain stage in the development of civilization, Dr. Schliemann seems to entertain very misty notions. He speaks of finding in the

ruins of the palace arrow-heads of obsidian "rudely made; in fact, as rudely as the arrow-heads of silex found in the cave-dwellings of the age of the mammoth and the reindeer in the Dordogne, in France, and to be seen in numbers in the prehistoric museum at St.-Germain-en-Laye" (p. 78). But no such things exist as rude arrow-heads found in the caves of the Dordogne; and it is one of the commonplaces of prehistoric archeology that in the paleolithic period, to which these caves must be referred, bows and arrows had not yet been invented. He gives four drawings of these remarkable 'arrow-heads,' which precisely resemble four similar objects that the writer picked up upon the slopes of the Acropolis at Athens. But they are only fragments of obsidian flakes, which are abundant upon prehistoric sites in Greece; and they merely prove that a particular spot was occupied by man in the stone age. Yet the finding of these bits of stone, accompanied by fragments of rude, hand-made pottery, in the *débris* of the palace, furnishes our author his main argument to prove that it was destroyed in prehistoric times. But it is a common thing to find such fragments as these disseminated throughout the soil in the places where they occur; and, although Dr. Schliemann may have come upon them in the earth that has accumulated above the ruins of the palace, their presence proves nothing more than the antiquity of the site, whether it be at Tiryns or at Athens. But Dr. Schliemann can actually believe that such rude arrow-heads as these were still in use contemporaneously with the occupation of the remarkable edifice he has disinterred and described. His own excavations, however, at Mykenae had already disclosed the kind of stone arrow-heads employed at the close of the high civilization of the bronze age,—exquisitely fashioned out of obsidian, of the Solutré type, thin, delicate, and provided with barbs.

So, again, he argues for a very high antiquity for the earliest remains he has discovered, because he finds among them a kind of rude, hand-made pottery, consisting of vessels, or portions of them, provided with handles pierced with two perpendicular holes for suspension; while, of those having similar horizontal perforations, two examples only were met with. The former kind is not uncommon in the Swiss lake-dwellings, and in some other localities belonging to the Neolithic period; and he quotes Professor Virchow as authority for inferring from such similarity 'a direct connec-

¹ *Tiryns: the prehistoric palace of the kings of Tiryns. The results of the latest excavations. By Dr. HENRY SCHLIE-MANN. With preface by Prof. F. Adler, and contributions by Dr. William Dörpfeld. New York, Scribner, 1885. 42.*

tion' between the two places (p. 64). Virchow, however, had many other points of resemblance which are wanting at Tiryns, besides this single one, to bring forward, between the rude, early pottery of the two sites he was comparing.

The stages of civilization of the lake-dwellers of Switzerland and of the Homeric heroes differ as widely as does the dawn from high noon; and the endeavor to relegate the occupants of a palace whose artistic decorations excite only wonder and admiration to the status of the age of polished stone, or even of the early bronze age, displays a singular misapprehension of the teachings of prehistoric archeology.

That the huge, so-called Cyclopean walls of Tiryns should have inspired the belief in their hoar antiquity, and that around them should have clustered myth and legend, is not to be wondered at. The strange circumstance is, that it is in the later writers principally that this crop should have sprung up. It is worthy of remark that Tiryns is mentioned but once in the Homeric poems, and that only in the 'Catalogue of forces,' which by most scholars is regarded as a late interpolation. There it is characterized by an adjective which means 'the well-walled' (Iliad, ii. 559), and our author thinks that "Homer expresses his admiration for the walls by this epithet, which he bestows on Thebes" (p. 17). The fact is, however, that this word occurs in only one other passage in the poems, some hundred lines after its first use; and there it is applied, not to Thebes, but to the ancient city of Gortys, in Crete. This is the place where last year was discovered the longest and most important inscription yet known in the archaic Doric dialect, probably of the sixth century B.C. But at Gortys there are no Cyclopean walls, and we feel constrained to believe that the epithet was employed by the poet in both instances solely for its metrical advantages.

Leaving, then, the Homeric poems out of the case, there is no question that these huge walls have stirred the wonder and admiration of all modern travellers, and many have been the attempts to account for them, and to discover who were their builders. We can hardly, however, look upon Dr. Schliemann's as the most happy solution of the problem. He thinks that "we may assume with great probability that they were built by Phœnician colonists, and the same is probably the case with the great prehistoric walls in many other parts of Greece" (p. 28). How is it, then, we may ask, that a precisely similar style of construction is to be seen in mountain fastnesses in the Apennines of central Italy, where no foot of Phœnician trader ever penetrated, while no such example is to be found in Phœnicia

proper, or in her greater daughter, Carthage? Much more probable seems to be Mr. Gladstone's conjecture that they are "the handiwork of the great constructive race or races made up of several elements, who migrated into Greece, and elsewhere on the Mediterranean, from the south and east." But we doubt if the key to the mystery is to be sought in peculiarities of construction; since archeologists now are of one accord that the huge polygonal style of building, in all of its different varieties, to the rudest of which alone the epithet 'Cyclopean' should be restricted, arose from the natural cleavage of the material used for building-purposes.

Equally unsatisfactory seems to be Dr. Schliemann's attempt to overthrow the established date of the destruction of Tiryns by the Argives, 468 B.C., in favor of a period so much anterior to this as the return of the Herakleids, which he places at about 1100 B.C. In this, it is true, he is sustained by the authority of that most hardy of the investigators of ancient history, Professor Sayce, while Professor Mahaffy also rejects the received chronology. But it is certainly suggestive that the very passage in the Iliad (iv. 52) which is cited by Professor Sayce in confirmation of such a theory, should have been previously brought forward by another eminent iconoclast, Professor Paley, as equally conclusive to establish the comparatively late date of the existing version of the Homeric poems.¹ But the universal consensus of historians, backed by the irrefragable testimony of the bronze serpent, which once supported the golden tripod dedicated by the Greeks at Delphi in commemoration of the battle of Plataea, and which is now to be seen in Constantinople, would seem to outweigh our author's archeological evidence in support of his new view, which would appear to consist of a *graffito* in eleven archaic letters scratched upon a bit of 'lustrous black Hellenic pottery,' re-enforced by numerous rude female images, which possibly may be only archaic, and which, at any rate, bear a striking resemblance to the children's playthings found in the tombs at Athens.

But enough, perhaps too much, has been said about our author's theories: let us turn to some of the actual gains to knowledge acquired by his liberal use of the spade at Tiryns; only we must first enter our protest against his failure to do justice to his townsman, Dr. Rhauagabé. Referring to the appearance of the site before he commenced operations there, he says, "Many of the walls were visible on the surface, and had misled the best archeologists, as they were assumed to be

¹ Transactions of the Cambridge philosophical society, xi. p. 368.

medieval, and it had never been imagined [that they could be perhaps two thousand years older, and belong to the palace of the mythical king of Tiryns" (p. 8). Who would suppose, upon reading this, that twenty years ago Dr. Rhaugabé, in his 'History of ancient art' (p. 63), had stated that "it is highly probable that these are the remains of the primitive palace of Proetus"? We have here an instance of the same self-complacency which manifests itself also in a remark about his "excavations in the prehistoric tumulus on the plain of Marathon, which previously had been wrongly regarded as the tomb of the one hundred and ninety-two Athenians who fell in the battle" (p. 78). Dr. Schliemann seems to have never read Byron's well-known verses upon Marathon and 'the violated tomb,' and not to know that years ago the tumulus was explored by a Frenchman; which may, perhaps, explain why our author found so little in it, even if its situation itself, in a sandy plain hard by the water's side, would not be sufficient to account for the disappearance of the bones of the heroes who were buried under it, as we may fairly infer from what Thucydides and Pausanias and Kritias tell us.

The first decisive result of the explorations at Tiryns has been to establish the fact of the existence there of two successive structures, built upon a limestone rock which rises to a slight elevation above the surrounding plain. The primitive fortress was constructed of sun-dried bricks and wood, according to Professor Adler, and traces of the sub-structures of a huge gate-tower belonging to it were discovered under the foundations of the palace (p. xii.). Remains of its walls built of rubble and dry mortar of clay were found by Dr. Dörpfeld, buried deep in *débris*, through which a trench had to be dug before the foundations of the terrace-wall of the upper citadel could be laid (p. 253). Besides these proofs drawn from the construction, there were found among its ruins numerous fragments of rude pottery, mostly hand-made, though in some instances showing a knowledge of the potter's wheel, which presents so great a contrast in form, *technique*, and decoration, to the pottery occurring in the ruins of the subsequently erected Cyclopean palace, as to prove, in Dr. Schliemann's judgment, that they are the work of totally different peoples. This opinion is based upon arguments derived from the continuity of style always to be observed in the art-products of the same race, even at very different periods, which he ascribes to Mr. Dennis, but which really ought to be credited to Professor Brizio (p. 57).

But the crowning achievement of Dr. Schliemann's labors has been the discovery that those

vast walls, piled up, of huge unhewn stones, so massive that in the exaggerated language of Pausanias "a yoke of mules could not move the smallest of them from its place," were raised for the defence of 'a lordly house,' of which the uniformity of design in its ground plan, and the skilful distribution and arrangement of all its parts, have given to the trained eye of an architect a most favorable impression of the builder's talent and experience. It is indeed a revelation to the world that the high stage of civilization which the Homeric poems disclose was not merely a poet's dream. In the glowing language of Dr. Dörpfeld, "we see the mighty walls, with their towers and gates, and enter into the palace by the pillar-decked Propylæad. We recognize the men's court, with its great altar, surrounded by porticos; we see, further, the stately Megaron, with its ante-room and vestibule; we even enter the bath-room, and finally pass on to the women's dwelling, with its separate court and numerous chambers. This is a picture which floats before the mind of every reader of Homer, — a picture which many a *savant* has endeavored to restore after the data given by him. All such attempts, hitherto, have been to some extent unsatisfactory. There always remained questions to which all the acuteness in the world, on the part of Homeric scholars, could give no answer in the words of the poet. Many of these riddles are now solved by the palace at Tiryns" (p. 192). But to attempt even the briefest *résumé* of the interesting and instructive chapter in which Dr. Dörpfeld has given a detailed account of the plan of the citadel, and the singular method of construction of its walls, with their covered galleries and concealed chambers, of the arrangement of the approaches to it and the hitherto unknown stairway conducting to the postern gate, and finally of the palace itself in all its several parts, and the building-materials employed in it, as these all were brought to light in the explorations of the summers of 1884 and 1885, — this would far exceed the space at our command. We can only refer to some remarkable discoveries, which throw light upon the character of the civilization to which the building belongs, and which are most striking from their novelty.

We think the series of nine plates, in which are depicted fragments of plastered walls, painted with frescos in five different colors, cannot fail to stir the admiration of every lover of the beautiful, whether he be a student of antiquity, or not. Who could have imagined that the palace walls, in the Homeric age, were ornamented with decorations which for beauty and grace of design, and freedom and boldness of execution, surpass the fresco-painting of our own day? What life and power

the figure-piece of the bull-tamer, leaping upon the back of the beast in full career, displays! The beautiful frieze made of slabs of alabaster, decorated with sculptured ornaments and inlaid with pieces of dark blue smalt, is most interesting, not only for its intrinsic elegance, but for the confirmation it has given to a conjecture of Helbig in explanation of one of the Homeric puzzles, the nature of the frieze of *kyanos*, which adorned the palace of Alkinoös (*Odyssey*, vii. 86). This is the substance which Mr. Gladstone supposed to have been bronze, and which Mr. Evans, following the general opinion, has reluctantly conceded to have been dark blue steel, but which we now have every reason to believe to have been a blue glass paste. Another surprising discovery was the bath-room, containing a fragment of a bathing-tub, made of thick terra-cotta, and resembling in form similar articles in use to-day. After such a substantiation as this, of the numerous instances in the Homeric poems where mention is made of the 'well-polished bathing-tubs,' we may perhaps feel warranted in believing that in the heroic age sometimes these were actually made of silver, like the two which 'Polybus, who dwelt in Thebes in Egypt,' gave to Menelaus (*Odyssey*, iv. 128).

Reluctantly we lay aside this interesting volume, fully sharing in the regret expressed by Dr. Dörpfeld at the fate that must speedily overtake much of what has thus been brought to light after its sleep of centuries in the lap of mother-earth. He says that it is doomed to certain destruction, although the Greek government intends to do all in its power to protect the palace with a roof and in other ways (p. 250). But even if the material parts must perish, its teachings have been embalmed forever for posterity in this noble volume, which, as we said at the outset, we owe to the liberality and enthusiasm of Dr. Schliemann.

WINTER ON MOUNT WASHINGTON.

THERE are three distinct types of winter weather on Mount Washington that offer good illustration of the control of wind over temperature. The most common, and certainly the one most frequently associated with the popular estimation of the mountain's weather, appears with the westerly or north-westerly winds of considerable strength that blow between a centre of low barometric pressure lingering over the provinces or in the Gulf of St. Lawrence, and a centre of high pressure on the lakes or in the Ohio valley. The sky is clear or fair, the wind blows fifty to eighty or more miles an hour, and the temperature falls to a point worthy of newspaper items. This is the time of hardship for the observers in the

signal-service station: clearing the anemometer cups of the frost-work that forms on them is then no pleasant task; but, if not cleared, the frost-work fills the cups, and prevents their proper turning, or they become so heavy that the centrifugal force of their rapid whirling may tear them from the axle. The cold is so intense and penetrating with the high wind, that the stoves have to do their utmost to keep the station habitable. A conflagration at such a time would be almost certain death to the men, for they could not descend the mountain in such weather.

On the 29th of last January there was a sample of this type: a storm-centre had passed the day before; the wind shifted from south to north-west, and rose to one hundred miles an hour, — if the records in recurring round numbers can be accepted as precise, — and at seven o'clock in the morning the temperature was -32° . At the same time, the temperature at Boston was 0° ; at Portland, 2° ; and at Montreal, -9° . The cause of the extreme cold on the mountain is, first, that its winds come rapidly from the cold north-west, without having time to warm up very much on the way; and, second, that they are forced to rise more or less in passing over the mountain, and thus are cooled by expansion about half a degree for every hundred feet of ascent. In other words, the cold is chiefly imported, but is partly a home product. The temperature is not excessively low: it is higher than the records give for the far north-west, and much higher than the minima known in Siberia; but it is harder to bear on account of the terrific winds that accompany it. Residents in Montana and Siberia unite in having a good word for the calm, dry cold of their frigid winters, but no word of praise for the windy cold on Mount Washington appears in the signal-service reports. Other examples of this type, illustrated in the old reports and maps, are Dec. 30, 1873; Jan. 16, 17, 25, 26, 1874.

The second type appears when the mountain stands a moderate distance from a storm centre, generally to the east or north of it. The temperature is then relatively high, and the weather cloudy or rainy. Jan. 16, 1885, will serve for an example of this. The storm-centre was then to the west of the mountain, but not far away, as the wind was from the south, sixty miles an hour. It was snowing, and the air was nearly 'saturated' with vapor; the air temperature at 7 A.M. being 29° , and the dew-point 28° . At the same time, the temperature at Boston was only 32° , while that at Portland was 24° . Montreal failed to report that morning, but was undoubtedly colder still. Now, if there is any propriety in averages, Mount Washington ought to be in win-

ter fifteen or sixteen degrees colder than its neighboring sea-level stations. Here it is as much too warm as it was too cold in the first type. Although it is near the storm-centre, where the winds are supposed to ascend obliquely, the air on the mountain is evidently not derived from the low-level stations near by; for, independently of the evidence furnished by the wind's direction and velocity against such a conclusion, the temperatures disprove it. If a current of air ascend from sea-level to the top of Mount Washington, its temperature must fall at least eleven degrees, even if the cooling from expansion were retarded by condensation of vapor through the whole ascent. The surface source of the wind, if it come from the surface at all, must therefore be sought many miles south of New England, in the southern states or on the Gulf Stream, where the temperature is fifteen or twenty degrees higher than in Mount Washington latitudes. Then, as in the first case, the temperature on the mountain is largely a matter of importation; but now the cooling by ascent abruptly up the mountain sides, or gradually in the cyclonic whirl, acts to destroy the imported characteristics of the wind, instead of to confirm them, as before. In the pronounced examples of this type, when it is warmer on Mount Washington than at Boston, we find illustration of the inversion of temperature, that is generally held to be peculiar to anticyclonic weather, as will be explained below; and although such cases are not, so far as I know, characteristic of other mountain stations, they are not rare on Mount Washington. Examples may be found on the old maps for Dec. 3, 27, 1873; Jan. 7, 8, 27, 28, 1874. The warm waters of the Gulf Stream, and the rapid decrease of temperature with latitude along our eastern coast, must be chiefly responsible for this. Another factor of hardly less importance is the fivefold greater velocity of the winds at the height of Mount Washington over those at the earth's surface. As a storm-centre draws near, the winds on the mountain may be derived from a source four or five times as distant to the south as that which supplies the low-level stations. Thus the ordinary decrease of temperature with height is overcome. Montreal is decidedly colder than the three other stations at such times; for it is well to the north of the storm-centre, and draws its winds from northerly sources.

The third type is one that has attracted much attention in Europe of late years, on account of the very abnormal temperatures that accompany it. It appears when a centre of high pressure—an anticyclone—passes over the mountain, and, when fully developed, it causes a remarkable inversion of weather elements. We are accustomed

to see mountain-tops cold and cloudy, while the valleys about them are warmer and clear; but anticyclonic weather places the cold and the clouds in the valleys, while the peaks rise into brilliantly clear, warm, dry air. Dr. Hann was the first to give a full explanation of the facts, in 1876, and I follow him in this statement. In an anticyclone, the few lofty clouds that are observed generally move towards its centre; the surface winds move outwards to all sides; with converging currents above, and diverging below, there must be a descending current about the centre; the descent is probably slow, but it undoubtedly exists. This type, therefore, involves the consideration of the temperature of air derived from regions of the atmosphere far above the mountain-tops. The first opinion that one would have of such temperature would probably be to place it well below freezing, for we are all familiar with the excessive cold experienced in very lofty mountain ascents and balloon voyages. But this is wrong. Although undoubtedly cold while up aloft, air that descends from the upper regions is compressed as it comes under greater atmospheric weight near sea-level, and it is thereby warmed. A current coming down from a moderate altitude in summer might be cooler than the surface air; but in winter it would be in practically all cases decidedly warmer. The statement of this fact is not particularly new, but its recognition and general application are a recent progress in meteorology. More than forty years ago, Arago, Pouillet, and Babinet reported to the French academy that "it is proved by the investigations of Mr. Epy that one should not hereafter attempt to adduce, in the mean state of the atmosphere, a descending current of air as a cause of cold."

It is, then, to the descent of air from aloft that we are to look for the abnormal warmth and dryness of mountain-tops in anticyclones. It remains to account for the extreme cold that prevails at the same time in the neighboring valleys. An illustration of the contrast is given by Professor Upton in the second Bulletin of the New England meteorological society. On the morning of Dec. 27, 1884, when the winds were everywhere light, and the pressure higher than on the days before or after, the temperature on Mount Washington was $+16^{\circ}$; at the low-level stations north of Massachusetts, it was -10° , or colder. On consulting the records, I find Grafton and Littleton, N.H., -18° ; Hanover, N.H., and Newport, Vt., -20° ; Woodstock, Vt., -27° ; Portland, Me., $+7^{\circ}$. The lower cold must therefore be in spite of, not on account of, the down-cast current; and we are forced to believe that it is caused by rapid cooling of the ground, and of the air close to it, by

radiation through the clear, dry air above. It is not at first apparent why the ground should cool to an excessively low temperature, while the air above it remains comparatively warm: it is because solids can cool by radiation, just as they can warm by absorption, much more quickly than gases. For this reason, the upper air changes its temperature but little from day to night; while the ground, and to a certain extent the air near it, have a large diurnal range. Now, during an anticyclone, radiation from the ground is rapid through the clear, dry air; thus the temperature falls very low, and the air on or near the earth's surface is greatly cooled. If the descent of the air were rapid, radiation would not have time to overcome the warmth gained by compression; and it is known, that, when the surface wind springs up in an anticyclonic centre, the temperature rises with it. But generally the descent is slow; and, when near the ground, the down-current turns aside as a slow horizontal out-flow; it becomes heavy as it is chilled, and tends to collect and stagnate in depressions. Ground fogs form when the dew-point is reached, and then the contrast is complete between the clear, pleasant weather on the peaks, and the cold, damp air in the valleys. In the first and second types the temperature is chiefly imported; in the third it is essentially of local origin over the mountains. December, 1879, gave a famous example of an inversion on a large scale in Europe, and much was written about it. An enterprising mountain-climber ascended a peak in the Alps east of Lake Geneva on Christmas day, and was rewarded by rising above the dense clouds that covered the lake and filled the cold valleys, and finding fine, clear, relatively warm weather on the mountain-top. A few examples of such inversions must make our observers wish they were in a region of permanent high pressure, instead of in one of the stormiest countries of the world. W. M. D.

JAPANESE HOUSES.

THE opening of the empire of Japan to foreign intercourse has furnished more subjects of inquiry to the student of human development than any event of recent times. Here is a nation which has been secluded for centuries from all except the most insignificant external influences. During this seclusion, modern European civilization, with its science and arts, its comforts and refinements, has virtually come into existence. In the mean time, the secluded nation, mainly without

help or hindrance from its neighbors, has been engaged in working out the problem of its national life in its own way. Suddenly the curtain is raised, and we are permitted to look in upon the spectacle so long in preparation. For a quarter of a century we have been studying the scenes thus revealed to us, and have not yet fully succeeded in making out their meaning.

That the Japanese race is one possessed of native vigor and resources is shown by the outcome of this long experiment of isolation. With all the disadvantages arising from the want of free foreign intercourse, they have made such progress in the arts of civilization as to challenge our admiration. In intellectual activity, in warlike and chivalric achievement, in gentle and amiable manners, in the refinements and amenities of life, they may certainly bear favorable comparison with the most cultured races. They present to us a strange mixture of excellences and defects. While as a nation they are conspicuously brave and warlike, they have devised and developed few formidable implements of war. They have built great cities, and conduct a vast system of trade; and yet their ships and warehouses, and public and private buildings, seem, by the side of ours, fragile and temporary. They manufacture the most exquisite and tasteful fabrics and wares, and yet the mechanical appliances of their arts are rudimentary.

We are thankful to any one who will help us to gain some insight into the character and life of such an interesting people. It was a most happy thought of Professor Morse to make a careful study of the Japanese house. Nothing can aid us more in understanding the life of the occupant than to describe his dwelling-place and the implements and furniture which he gathers into it. Fortunately for us, the author of this book combined in himself the faculty of the scientific observer and the skill of the artist. We may safely say that here, for the first time, we have intelligible sketches of the Japanese dwelling-house, and intelligible explanations of the uses and arrangement of its furniture. Heretofore we have had chiefly photographs of exteriors and gateways and street scenes, or, instead of that, we have been treated to reproductions of native Japanese drawings by engravers who did not understand the drawings. It is the experience of every stranger visiting this country, that, notwithstanding all that he has tried to learn from books about Japan, he is as much amazed at the real Japanese house and surroundings as if he had never seen an illustration of them. Professor Morse, on the contrary, has gone about with eyes in his head and a pencil in his hand. The minuteness and

Japanese homes and their surroundings. By EDWARD S. MORSE, with illustrations by the author. Boston, Ticknor, 1896 [1895]. 8°.

accuracy of his information surprise us at every page. It must be confessed that it required a good degree of enterprise and assurance to have secured some of his sketches. The Japanese are a most amiable and polite people; but they must have been amazed, and perhaps amused, at the persistency with which the artist went about peering behind their screens, under their mats, and into their closets. We, however, have no reason to complain; for he has seen for us far more than we could have seen for ourselves, and has brought to us such a budget of facts, and such a portfolio of illustrations, as we could not have gathered for ourselves in a lifetime.

In any country a dwelling-house is the product of complicated causes. Climate, the prevalence of destructive agencies, the character of the material available, the skill of the mechanics, the wealth of the people, the growth of artificial physical wants, the development of a taste for the beautiful and refined in life,—all these are potential causes in determining the character of the dwelling. These causes account for most of the peculiarities of the Japanese house, as compared with our own. From time immemorial, Japan has been visited by earthquakes and typhoons. These will explain why the Japanese builds his house as low as possible, and prefers wood to stone. The climate is mild, and does not demand the formidable provision against the cold with which we are familiar. This may account for the absence of chimneys and stoves. It puzzles us, however, to understand why the Japanese, who has shown such cleverness in the development of many of the arts of civilized life, has made so little progress in others. In 1542 the Portuguese landed on the southern islands of Japan, and left there, among other traces of their visit, a number of the matchlock guns which were in common use in Europe at that time. After the lapse of more than three hundred years, you can see the hunter of to-day out on the hills with a gun which is of the identical pattern which the Portuguese brought thither. The Japanese gunsmith has found out how to make the matchlock a far more ornamental weapon than it was in the hands of the Portuguese. He has decorated the stock, and inlaid the barrel with gold and silver, and provided it with exquisite fittings; but still it is the same old matchlock, without a single effective part changed or improved. Such absence of progress is surprising; but it does not surprise us half so much as their marked superiority in other and more difficult arts. In the modelling and decoration of pottery; in ornamental metal-work; in weaving and embroidery; in painting, carving, and enamelling; in the exquisite work-

manship of their lacquer wares,—their achievements put them in the very first rank.

In all these departments of industry the Japanese now have an acknowledged position. It has not been so well known that in many of the humbler departments their work is scarcely less to be admired. Professor Morse has given us, in this volume, sufficient evidence of the excellence of their carpentry and joinery, of their skill in gardening, and of their cleverness in making both house and garden contribute not only to the physical comfort, but to the intellectual pleasure of the occupants. We are specially indebted to the author for exhibiting to us so clearly the internal arrangements of a Japanese dwelling-house, and the domestic routine which goes on in it, and the evidences of comfort and refinement which are everywhere seen. The beautiful products of their ornamental arts have become familiar to us, and are almost as much at home in our houses as in theirs. But the implements of common life are still strange to us; and we are thankful to Professor Morse, who, in this book, has given us so much information about them. I need only mention such illustrations as those of a carpenter's tools, of a thatched roof, of the interiors of dwelling-houses, of a kitchen range, of their bath-tubs and lavatories, of their candlesticks and lamps, of their wells and water-buckets, of their gardens and garden-lamps, to show how varied and interesting are the contents. We are sure that Professor Morse's portfolio is not yet exhausted; and it only remains for us to express the wish that in due time he may open for us another instalment of his delightful wares.

PHYSICAL EXPRESSION.

In the term 'physical expression,' Dr. Warner includes all those changes of form and feature occurring in the body which may be interpreted as evidences of mental action. Such changes are taking place constantly, and in response to all kinds of mental impressions. The majority of them are involuntary, and, so far, trustworthy, it being the height of art to simulate a feeling successfully. At first thought, it would seem that facial expression is the most important of these outward signs of inner processes; but a little observation will convince one that the posture assumed by the body,—the poise of the head and the position of the hands,—as well as the many alternations of color and of general nutrition, are just as striking evidences of the course of thought. And such changes may be permanent as well as

Physical expression: its modes and principles. By FRANCIS WARNER, M.D. (International scientific series.) New York, Appleton, 1885. 12°.

temporary, thus displaying the general caste of mind as well as the transient emotion by which the individual is excited. The subject thus developed by the author becomes quite extensive, and is exceedingly interesting. By studying it in animals and infants, in whom the higher mental control which often modifies involuntary changes of expression in adults is absent, by showing its practical application in enabling one to read character, and by drawing from the realms of art as well as nature for his illustrations, Dr. Warner has succeeded in bringing together an entertaining series of facts, and deducing from them some instructive conclusions. We all believe that we can detect the real feelings of others in their faces, and that we can successfully conceal from others our own thoughts. How difficult both processes may become, and yet how fully they repay some study, the readers of this very pleasing work will learn.

In the last chapter the author describes an ingenious piece of apparatus by means of which the motions of the hand may be graphically recorded in those diseases in which irregular movements occur. He has evidently made some study of such affections, as the facts recorded in chapter vii. show. How far such a chapter may be generally appreciated in a popular work is questionable, as the terms employed would be intelligible only to physicians. But the subject would have been incomplete had the changes of expression incident to disease not been alluded to. To those who are curious to go into the subject more deeply than is possible in a popular treatise, the bibliography on pp. 344-346 will be of service. The work is fully up to the high standard maintained in this series, and is by no means the least interesting of the volumes already published.

M. A. S.

REFORMS IN ENGLISH PUBLIC SCHOOLS.

THE public schools of which Mr. Cotterill writes are British, not American, and his starting-point is ahead of any thing that can be proposed as an immediate goal in other countries, — ahead, at any rate, in this, that English public schools already, as a matter of fact, are nurseries of character quite as much as institutions of learning. Mr. Cotterill's suggestions are mostly in the line of character. Health of character is for him the end of education. He is down on competitive examinations of a severe sort, would have a test of proficiency in bodily exercises introduced into those of the Indian civil service, believes in making out-door exercise compulsory on all boys three days in the

week, each boy 'changing into his flannels' for the purpose, would restrict the 'tuck-shop' facilities the boys now have, and disbelieves in giving them too much help, whether intellectual or physical. Translations, and aid from the teacher beyond a certain point, are in his eyes equally bad; and the boys ought to prepare their own cricket-grounds, and take care of their own play, with less professional aid than they now appear to get in the larger schools. He believes in 'manual training' thoroughly, for a variety of reasons, not least among which is that it widens sympathy among classes. The book is a refreshing example of the sort of spirit the English public schools, even in their present 'unreformed' condition, engender, and increases the reader's desire to see them imitated here on a larger scale than heretofore.

THE government of Tasmania are, according to *Nature*, making arrangements upon a large scale for naturalizing lobsters, crabs, turbot, brill, and other European fishes in the waters of that country. The various consignments will be shipped at Plymouth, and transported through the medium of the steamship companies trading between London and Hobart. An exhaustive report has been published by the Government of Tasmania, setting forth the objects in view, and giving suggestions for carrying them into effect. The report adds, that, while the achievement of the acclimatization of European fishes would lay the foundation of new and very valuable fishing industries in Tasmania, it might also prove a highly remunerative commercial enterprise to the shipping firms under whose auspices the operations will be conducted. Applications have been made in various quarters for supplies of fish, which have been satisfactorily responded to. Special tanks are being prepared, as well as apparatus, in order to provide for the necessities of the fish *en route*, which, it is anticipated, can be transmitted with little difficulty. The success that has hitherto attended the acclimatization of certain European fishes in New Zealand has had the effect of inspiring the government of that colony with considerable enterprise in developing their fisheries. They are now about to collect the ova of Salmonidae from English waters in large numbers through the instrumentality of the National fish-culture association and other bodies, with a view to rearing the fry in New Zealand. A shipment of eggs will also shortly be sent to Australia, where great success has attended the introduction of our fishes, except in a few instances, when failure resulted more from misadventure than from the impracticability of the attempt.

Suggested reforms in public schools. By C. C. COTTERILL, M.A. Edinburgh and London, Blackwood, 1885. 12s.

